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EXAMINER

MOORE, IAN N

ART UNIT PAPER NUMBER

2661

DATE MAILED: 05/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,058

Applicant(s)

GIBSON ET AL.

Examiner

Ian N Moore

Art Unit

2661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: **Label Switched Traffic Routing and Signaling in a Label Switched Communication Packet Network.**

Claim Objections

2. Claim 16 is objected to because of the following informalities: "...**a said** path..." in line 16. For clarity, "**a**" should be removed since the path refers to an end-to-end path. Appropriate correction is required.
3. Claim 8 recites the limitation "...**the partial routes**..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "...the partial routes..." in line 1. It is unclear what/which/where are the partial routes. In particular, it is unclear the partial route are "label switch paths", "constraint based routing paths", or "pre installed cross connections".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1,6,13-17 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by in view of Kodialam (U.S. 6,538,991).

Regarding Claims 1, 17 and 23, Kodialam'991 discloses a virtual router (see FIG. 6, **Interconnection node N1-N15**), embodied as software in machine readable form on a storage medium (see FIG. 4, **a flow chart software algorithm for LSP establishing/installing**) arranged to route traffic in a packet network (see FIG. 6, **MPLS network**; see col. 5, lines 13-14) in which label switched paths are installed (see FIG. 5, **LSR/Router 500 stores Forwarding Table 510 and policy rules 511**) to execute a method comprising the step of:

means for defining and installing partial routes (see col. 3, lines 52-58; note that according to the request, the segment/partial/portions of the LSP routes between the source and destination nodes are defined and established/installed as portions of the

Art Unit: 2661

end-to-end route) each comprising two or more paths (see FIG. 6, note that there are two or more paths in each partial route (i.e. partial route 1 of N1-N4-N9-N10 comprises three paths between the nodes)) such that an end-to-end route across the network can be defined as the concatenation of two partial routes (see FIG. 6, first partial route is between N1-N4-N9-N10, and second partial route is N10-N13, which forms an end-to-end N1-N4-N9-N10-N11; see col. 11, , lines 5-59; Table 1, LSP installing/establishing request number 4 of constraint base routing; note that the source S1 to destination D1 pair (i.e. end-to-end route between Node 1 and Node 13) across the network is defined/described as concatenation/combining of two partial routes).

Regarding claim 6, Kodialam'991 discloses a method of operating a multi-protocol label switched packet network (see FIG. 6, MPLS network; see col. 5, lines 13-14), the method comprising:

partitioning the network by using constraint based routing to install label switched paths and corresponding labels (see col. 3, lines 50-58; note that the network is portioned/divided by provisioning network tunnel path and using constraint based routing. The segment/partial/portions of the LSP routes and their corresponding labels (see FIG. 2, labels are stored in the header portion) between the source and destination nodes are defined/established/installed), and

multiplexing sessions by applying cross connections (see FIG. 5, Forwarding Table 510 of the label switched router 500) at a higher label level (see FIG. 6, first partial route/session is between N1-N4-N9-N10, and second partial route/session is N10-N13,

which forms an end-to-end route N1-N4-N9-N10-N13; see col. 11, lines 5-59; Table 1, LSP installing/establishing request number 4 of constraint base routing; note that two partial sessions/routes are multiplexed/combined into an end-to-end session/route (i.e. N1-N4-N9-N10-N13) by utilizing/applying cross-connections according to the forwarding table. The forwarding table performs cross-connections/forwarding/routing at the requested higher QoS bandwidth level label or demand “bd”; see FIG. 2, label 201 includes QoS label; see col. 2, lines 56-67; col. 6, lines 18-35; col. 10, lines 44-56).

Regarding Claim 13, Kodialam'991 further discloses a method of signaling to establish an end to end path in a multi-protocol label switched packet network (see FIG. 6, MPLS network; see col. 5, lines 13-14), the method comprising:

sending path reservation requests as tunnelled resource reservation protocol (RSVP) messages between first and second virtual routers (see FIG. 3, RSVP messages between Routers/Nodes N1-N11; col. 5, lines 51-64, see col. 7, lines 1-14; note that an RSVP signaling messages are sent between the routers/nodes to request the tunnel).

Regarding Claim 14, Kodialam'991 further discloses wherein said tunnelled resource reservation protocol messages are encapsulated (see FIG. 2, Label 201; see col. 2, lines 43-67; see col. 3, lines 1-4,35-39, 55-64; note that labels with RSVP messages are encapsulated.)

Art Unit: 2661

Regarding claim 15, Kodialam'991 discloses sending RSVP signaling messages as described above in claim 13-14. Kodialam'991 further discloses wherein path information (see **FIG. 2, service level information regarding the path**) is carried within a policy element (see **FIG. 2, bandwidth demand field, bd 212**) in said message. Thus, it is clear that a policy element must be RSVP policy element.

Regarding claim 16, Kodialam'991 discloses wherein a said path (i.e. **an end-to-end path**) is established as first and second half paths (see **FIG. 6, first half path is between N1-N4-N9-N10, and second half path is N10-N13**; see col. 11, lines 5-59; Table 1, LSP installing request number 4 of constraint base routing; note that the source S1 to destination D1 pair (i.e. **end-to-end route between Node 1 and Node 13**) across the network is established/installed as first and second half paths).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-5 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam'991 in view of Ebata (U.S. 6,708,209).

Regarding Claims 2 and 18, Kodialam'991 discloses wherein said network as described above in claims 1 and 17.

Kodialam'991 does not explicitly disclose partitioning into a plurality of autonomous system regions.

However, the above-mentioned claimed limitations are taught by Ebata'209. In particular, B teaches a network (see **FIG. 1 network**) is partitioned into a plurality of autonomous system regions (see **FIG. 1, Autonomous Systems (AS) for Organization A-D; 1000-4000; col. 4, line 49-54; note that a network is partitioned/divided into four AS system regions/organization with corresponding border gateway router**).

In view of this, having the system of Kodialam'991 and then given the teaching of Ebata'209, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kodialam'991, by dividing/portioning into AS systems, as taught by Ebata'209. The motivation to combine is to obtain the advantages/benefits taught by Ebata'209 since Ebata'209 states at col. 1, line 60-65 and col. 4, lines 18-25 that such modification would provide a policy server to manage/control QoS of each AS network/organization locally based upon border router protocol, and enable the network system administrator to control each group/member information, priority, and resource allocation.

Regarding Claims 3 and 19, the combined system of Kodialam'991 and Ebata'209 discloses all aspects of the claimed invention set forth in the rejection of Claim 1-2 and 17-18 as described above. Kodialam'991 further discloses wherein the partial routes are selected

based on congestion measurements (see col. 11, lines 1-4, lines 59-66; note that **partial routes based upon constraint base routing are selected according to the congestion/interference with other routes sine less congested route may not be minimum/shortest hop route**).

Regarding Claims 4 and 20, the combined system of Kodialam'991 and Ebata'209 discloses all aspects of the claimed invention set forth in the rejection of Claim 1-3, and 17-19 as described above. Kodialam'991 further discloses wherein said partial routes comprise cross connections (see **FIG. 5, Forwarding Table 510 of the label switched router 500**) in label switching nodes (see **FIG. 6, label switched router N1-N15**; see col. 10, lines 44-56; note that each labeled switched router forwards/routes/cross-connects according to the forwarding table, thus, the forwarding table is the cross-connections table which stores the segment/partial/portions routes).

Regarding Claims 5 and 21, the combined system of Kodialam'991 and Ebata'209 discloses all aspects of the claimed invention set forth in the rejection of Claim 1-4, and 17-20 as described above. Kodialam'991 further discloses wherein said paths and partial routes are installed. Ebata'209 discloses said paths and partial routes are installed via a common open policy service protocol (see **FIG. 19, steps 516,306,307,310 utilizes COPS protocol for reservation paths/routes**; see col. 14, lines 30-44. Also, see col. 16, lines 13-34; note that the paths/routes are installed/reserved/established by utilizing Common Open Policy Service protocol).

In view of this, having the system of Kodialam'991 and then given the teaching of Ebata'209, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kodialam'991, by providing COPS to reserve/install/establish the paths/routes, as taught by Ebata'209. The motivation to combine is to obtain the advantages/benefits taught by Ebata'209 since Ebata'209 states at col. 16, line 60-20-34 that such modification would provide a mechanism allowing servers and routers to exchange network policies and performs resource allocation.

Regarding Claim 22, the combined system of Kodialam'991 and Ebata'209 discloses all aspects of the claimed invention set forth in the rejection of Claim 21 as described above. Kodialam'991 further discloses signalling means for sending path reservation requests as tunnelled resource reservation protocol (RSVP) messages between first and second virtual routers (see **FIG. 3, RSVP messages between Routers/Nodes N1-N11; col. 5, lines 51-64, see col. 7, lines 1-14; note that an RSVP signaling messages are sent between the routers/nodes to request the tunnel**).

7. Claims 7-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam'991 in view of Chuah (U.S. 6,408,001).

Regarding claim 7, Kodialam'991 discloses wherein pre-installed cross connections (see **FIG. 5, Forwarding Table 510 of the label switched router 500 stores the pre-installed/established/reserved connections**) achieve multiplexing into the label switched paths (see **col. 11, lines 5-59; Table 1, request# 4 (1-4-9-10-13) and #19 (1-4-9-10-11-13)**);

note that two partial/segment/sessions routes (i.e. 1st route 1-4-9-10; and 2nd route 10-13 or 10-11-13) are multiplexed/combined into LSPs between the same source (i.e. Node/Router 1) and destination (i.e. Node/Router 13)).

Kodialam'991 does not explicitly disclose wherein a label stack installed at an edge of the network acts as a source route.

However, the above-mentioned claimed limitations are taught by Chuah'001. In particular, Chuah'001 teaches wherein a label stack (see FIG.6, Label Stack 600) installed at an edge of the network (see FIG. 8, LSR 4 or LSR 5 is at the edge of the MPLS network 400) acts as a source route (see FIG. 8, a route between ITS4 and LSR4/5) such that pre-installed cross connections (see FIG. 8, LSR 7; see col. 5, lines 23-25; a predefined/pre-installed forwarding/routing label table at LSR) achieve dynamic multiplexing into the label switched paths (see FIG. 8, multiplex label switch paths 830 and 860; see col. 9, line 49-63; see col. 10, lines 1-35; note that two source segments/partial routes/flows toward the same destination are combined/multiplexed/aggregated into the label switched paths).

In view of this, having the system of Kodialam'991 and then given the teaching of Chuah'001, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kodialam'991, by providing a label stack installed at the edge of the network as a source route and aggregating/multiplexing segments/partial source routes, as taught by Chuah'001. The motivation to combine is to obtain the advantages/benefits taught by Chuah'001 since Chuah'001 states at col. 3, line 1-9

that such modification would reduce the packet processing time at each router, and since the routes/streams/labels are aggregated, the routers maintain and access fewer label.

Regarding Claim 8, the combined system of Kodialam'991 and Chuah'001 discloses all aspects of the claimed invention set forth in the rejection of Claim 6 and 7 as described above. Kodialam'991 further discloses wherein the partial routes are selected based on congestion measurements (see col. 11, lines 1-4, lines 59-66; **note that partial routes based upon constraint base routing are selected according to the congestion/interference with other routes sine less congested route may not be minimum/shortest hop route**).

Regarding Claim 9, the combined system of Kodialam'991 and Chuah'001 discloses all aspects of the claimed invention set forth in the rejection of Claim 6-8 as described above. Kodialam'991 further discloses wherein said partial routes comprise cross connections (see **FIG. 5, Forwarding Table 510 of the label switched router 500**) in label switching nodes (see **FIG. 6, label switched router N1-N15**; see col. 10, lines 44-56; **note that each labeled switched router forwards/routes/cross-connects according to the forwarding table, thus, the forwarding table is the cross-connections table which stores the segment/partial/portions routes**).

Regarding Claim 11, the combined system of Kodialam'991 and Chuah'001 discloses all aspects of the claimed invention set forth in the rejection of Claim 6 and 7 as described above. Kodialam'991 further discloses the method is embodied as software (see

FIG. 6, Interconnection node N1-N15 performing a flow chart software algorithm for LSP establishing/installing see FIG. 4) in machine readable form on a storage medium (note that routers/nodes the method/process must be installed on the in machine readable form on a storage medium).

8. Claim 10 is and rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam'991 and Chuah, as in claims 7-9, and further in view of Ebata'209.

Regarding Claim 10, the combined system of Kodialam'991 and Chuah'001 discloses all aspects of the claimed invention set forth in the rejection of Claim 6-9 as described above. Kodialam'991 further discloses wherein said paths (see FIG. 6, note that there are two or more paths in each partial route (i.e. partial route 1 of N1-N4-N9-N10 comprises three paths between the nodes) and partial routes are installed (see col. 3, lines 52-58; note that according to the request, the segment/partial/portions of the LSP routes between the source and destination nodes are defined and established/installed).

Neither Kodialam'991 nor Ebata'209 explicitly disclose a common open policy service protocol.

However, the above-mentioned claimed limitations are taught by Ebata'209. In particular, Ebata'209 discloses said paths and partial routes are installed via a common open policy service protocol (see FIG. 19, steps 516,306,307,310 utilizes COPS protocol for reservation paths/routes; see col. 14, lines 30-44. Also, see col. 16, lines 13-34; note that the paths/routes are installed/reserved/established by utilizing Common Open Policy Service protocol).

In view of this, having the combined system of Kodialam'991 and Chuah'001, then given the teaching of Ebata'209, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined system of Kodialam'991 and Chuah'001, by providing COPS to reserve/install/establish the paths/routes, as taught by Ebata'209. The motivation to combine is to obtain the advantages/benefits taught by Ebata'209 since Ebata'209 states at col. 16, line 60-20-34 that such modification would provide a mechanism allowing servers and routers to exchange network policies and performs resource allocation.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam'991 in view of well-established teaching in art.

Regarding claim 12, Kodialam'991 discloses a method of signalling to provide routing in a multi-protocol label switched packet network (see FIG. 6, MPLS network; see col. 5, lines 13-14), the method comprising:

sending a path message (see col. 7, lines 9-18; note that RSVP message is sent to established connection) from an end point (see FIG. 6, Source node/router S1) to a first virtual router (see FIG. 6, first Node/router N4, N8, or N9),

determining a path from the end point to the virtual router (see FIG. 2, label 201 and see FIG. 5, forwarding table 505; see col. 2, lines 36-50; see col. 10, lines 45-55; note that by utilizing labels in the header, a path is determined/defined between S1 and N4),

forwarding an identity of said path to a second virtual router (see FIG. 6, second Node/router N10, N11, or N13; see FIG. 5, forwarding table 505; see col. 10, lines 45-55;

note that by utilizing the forwarding table of the first node/router, a label of the path is determined/defined and forwarded to a second node/router),

determining a routing vector across the network (see FIG. 4, steps 401-405; see col. 7, lines 15-50, see col. 8, lines 1-7; note that a vector, which utilizes for routing, is determined/calculated across the network), and

providing the route/path based on the information identifying said routing vector (see FIG. 4, step 406; see col. 8, lines 18-26; note that a new route/path is provided/established between the nodes/routers based on the vector).

Kodialam'991 does not explicitly disclose returning information identifying said routing vector to the first virtual router.

However, the above-mentioned claimed limitations are taught by well-established teaching in art. In particular, well-established teaching in art returning information identifying said routing vector to the first virtual router. **Note that it is well known in the art that RSVP signaling request and responses messages are transmitted with the routing information (i.e. QoS bandwidth/resource) between the routers/switches/nodes. Thus, Kodialam'991's second node/router must respond/acknowledge back to the first node/router by identifying and providing the routing information.**

In view of this, having the system of Kodialam'991 and then given the teaching of well-established teaching in art, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kodialam'991, by providing an acknowledgement/response by incorporating the routing information to the requester, as taught by well-established teaching in art. The motivation to combine is to

Art Unit: 2661


obtain the advantages/benefits taught by well-established teaching in art since well-established teaching in art states that such modification would ensure and increase reliability of end-to-end QoS between the nodes before the connection is established/installed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian N Moore whose telephone number is 703-605-1531. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 703-305-4798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER